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# **VERMONT CONSUMERS' GUIDE TO COMMUNITY WATER FLUORIDATION:**

**A QUESTION AND ANSWER GUIDE FOR CITIZENS,  
PUBLIC OFFICIALS, AND THE MEDIA**



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**Publication Prepared for:**

**Vermont Department of Health; Burlington, Vermont**

**This publication was originally made possible by grant number 1999-B1-CA-PRVS-01  
from the Centers for Disease Control and Prevention.**

**April 2005**

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## TABLE OF CONTENTS

|  |           |
|--|-----------|
| <b>Introduction .....</b>  | <b>4</b>  |
| <b>What is Fluoride and Why is it Necessary ? .....</b>  | <b>5</b>  |
| <b>What is Community Water Fluoridation and Why is it Important ? .....</b>  | <b>5</b>  |
| <b>Why Use the Public Water System to Provide Fluoride ? .....</b>   | <b>5</b>  |
| <b>Don't We Have Other Ways of Getting Fluoride ? .....</b>  | <b>6</b>  |
| <b>(1) Systemic Benefits of Fluoride .....</b>   | <b>6</b>  |
| <b>(2) Topical Benefits of Fluoride .....</b>  | <b>7</b>  |
| <b>How Much Fluoride is Added to the Drinking Water ? .....</b>  | <b>8</b>  |
| <b>Is the Amount of Fluoride in Fluoridated Water Systems Safe ? .....</b>   | <b>8</b>  |
| <b>How Widespread is the Practice of Community Water Fluoridation<br/>    in the United States ? .....</b>         | <b>9</b>  |
| <b>Are There States Which Require Fluoridation of Some Community<br/>    Water Systems ? .....</b>                 | <b>10</b> |
| <b>Who Benefits from the Cost Savings that Result from Fluoridation ? .....</b>                                    | <b>10</b> |
| <b>What Other Impact is Water Fluoridation Having on Consumer<br/>    or Taxpayer Costs ? .....</b>                | <b>11</b> |
| <b>Who Supports Community Water Fluoridation ? .....</b>   | <b>12</b> |
| <b>Who Opposes Community Water Fluoridation ? .....</b>  | <b>13</b> |
| <b>What are Some of the Claims Against Fluoridation<br/>that are being Made By Antifluoridationists ? .....</b>    | <b>13</b> |
| <b>Bone Health .....</b>   | <b>13</b> |
| <b>Adult Dental Health .....</b>   | <b>14</b> |
| <b>Total Fluoride Intake in Children and Adults .....</b>  | <b>14</b> |
| <b>Dental Fluorosis .....</b>  | <b>14</b> |
| <b>Skeletal Fluorosis .....</b>  | <b>15</b> |
| <b>Reproduction, Infertility, Birth Rates, Genetics,<br/>        and Sudden Infant Death Syndrome (SIDS) .....</b> | <b>16</b> |
| <b>Cancer, Heart Disease, Kidney Disease, AIDS,<br/>        Mental Deficit, and Alzheimers' Disease .....</b>      | <b>16</b> |

|  |    |
|--|----|
| Fluoride Status in Europe .....  | 16 |
| U. S. Environmental Protection Agency .....  | 17 |
| Toothpaste Warning Label .....   | 17 |
| Summary and Conclusions .....  | 18 |
| References .....   | 19 |
| Appendix I: National & International Organizations that Recognize<br>the Public Health Benefits of Community Water Fluoridation for<br>Preventing Dental Decay ..... | 26 |
| Appendix II: Bibliography .....  | 28 |
| Appendix III: Selected World Wide Websites with Scientifically<br>Accepted Fluoridation Information .....  | 29 |
| Selected State Agency & State Organization Web Sites .....   | 29 |
| Selected National Agency & National Organization Web Sites .....   | 29 |
| Selected International Web Sites .....   | 30 |
| Acknowledgement .....  | 30 |

## INTRODUCTION

Community water fluoridation has been utilized for more than 60 years as the principal public health measure to prevent the ravages of a common disease known as dental decay. Also known as dental caries, dental decay is a disease that ultimately results in the formation of dental cavities and can lead to dental infections (abscesses), loss of teeth, massive general (systemic) infections, and occasionally death. The treatment of dental decay also results in substantial direct and indirect costs to individuals, employers, insurance companies, consumers, and taxpayers. Community water fluoridation is one of the safest, most effective, and most economical programs that public officials can provide for their constituents in order to prevent the pain, suffering, and costs of dental decay.

Community water fluoridation is generally easy and inexpensive to implement - costing public water systems, on average, about 50 cents per person per year to operate<sup>1,2</sup>. The return on investment is tremendous - more than \$80 in dental treatment costs being avoided for each dollar invested in community water fluoridation<sup>2</sup>. Few health activities, and even fewer publicly financed programs, result in such a large amount of savings to consumers, taxpayers, insurance companies, and employers for such a small investment. Moreover, fluoridation has proven to be a safe, effective, efficient, economical, and environmentally sound means to prevent dental decay in children and adults. The implementation of community water fluoridation by public and private water systems serves as an excellent example of good public policy at work.



Former U. S. Surgeon General C. Everett Koop has frequently stated that:

***"Fluoridation is the single most important commitment a community can make to the oral health of its children and to future generations."***

## **What Is Fluoride And Why Is It Necessary?**

Fluoride is a naturally occurring substance that is present in virtually all sources of drinking water in the United States. It serves as an essential trace element necessary for the proper development of teeth and bones, and for the protection of teeth once they have erupted into the mouth. Therefore, fluoride not only benefits children before their teeth have come in, but it also protects the teeth of children and adults after all of their teeth are present in the mouth. Those fortunate enough to have had access to community water fluoridation experience 40-60% fewer dental cavities<sup>3</sup>.

## **What Is Community Water Fluoridation And Why Is It Important?**

Community water fluoridation is the precise adjustment of the existing naturally occurring fluoride levels in drinking water to a safe level that has been determined to be ideal for the prevention of dental cavities in children and adults. As previously mentioned, virtually all sources of drinking water in the United States contain some fluoride naturally. There are even some locations in the United States where naturally occurring fluoride levels are adequate for the prevention of dental cavities - these communities do not have to fluoridate their drinking water. However, most communities in the U. S. have insufficient levels of fluoride for effective prevention of dental decay. Therefore, these communities with insufficient naturally-occurring fluoride in their water require the addition of very small amounts of fluoride to achieve the optimal level for good health.

Community water fluoridation mimics a naturally occurring process and can be considered to be a form of enrichment or supplementation of the drinking water. Moreover, the concept of fluoridation as a measure to prevent dental decay is very similar to the supplementation of milk and breads with Vitamin D to prevent rickets; fruit drinks with Vitamin C to prevent scurvy; table salt with iodine to prevent goiter; breads and pastas with folic acid to prevent certain birth defects; and cereals with many different vitamins and minerals in order to provide for proper human development and to promote good health.

## **Why Use The Public Water System To Provide Fluoride?**

First of all, public water systems have been used for the purpose of preventing diseases in the United States since the 1840's. The original reason for the establishment and widespread use of community water systems by cities and villages was to prevent the outbreak of serious diseases like cholera, hepatitis A, and typhoid fever. Many other diseases, including dental cavities, are prevented through the treatment of drinking water. Water treatment for disease prevention is considered to be a primary public health activity and is essential for the control of many diseases that would otherwise plague modern society.

## **Don't We Have Other Ways Of Getting Fluoride?**

There are other ways to provide fluoride, but none are as effective as community water fluoridation for the prevention of dental decay in children and adults<sup>4-9</sup>. Fluoride benefits teeth in two general ways - there are (1) systemic benefits and (2) topical benefits.

**(1) Systemic Benefits of Fluoride:** Systemic benefits are gained when one drinks water and eats foods that contain fluoride. Systemic benefits can also be obtained by taking fluoride tablets or vitamins with fluoride that have been prescribed by a family's physician or dentist. More permanent in nature, the fluoride obtained from systemic sources actually becomes part of the tooth structure as baby teeth and permanent teeth develop under the gums of infants and children<sup>4</sup>. These teeth are then considerably stronger and resist dental decay much better once they have erupted into the mouth. This protection, gained from getting fluoride from systemic sources, generally stays with the teeth throughout life.

Systemic sources of fluoride also benefit older children and adults<sup>4-5</sup>. Fluoride from food and drink eventually ends up in a person's saliva. The fluoride in the saliva constantly bathes the teeth so that the teeth are protected continuously with low amounts of fluoride. For those older children and adults fortunate enough to live in fluoridated communities, this constant protection of the teeth by saliva containing small amounts of fluoride is substantial<sup>5</sup>. The fluoride from saliva not only prevents some cavities from ever starting, but it also repairs early dental decay through a process called remineralization<sup>5</sup>. With remineralization, some very small cavities are not only prevented from getting larger, they actually can "heal" or repair themselves because of the action of low levels of fluoride present in the saliva<sup>5</sup>.

It should be noted that community water fluoridation is much more effective, much safer, and much more economical than the use of prescribed fluoride supplements (fluoride tablets or fluoride vitamins)<sup>4-9</sup>. Community water fluoridation is always the best choice to prevent dental decay in children and adults, not only because it is safer, more effective, and more economical, but because it benefits all people using the public water system, regardless of age, race, ethnic background, or socioeconomic status<sup>4-9</sup>.

Fluoride tablets or vitamins with fluoride can and should be used in the absence of community water fluoridation, but are meant only as a temporary substitute until a community's water system can be fluoridated. Because they must be prescribed by a physician or a dentist, fluoride tablets or vitamins with fluoride often are only available to people fortunate enough to be able to afford regular visits to a family dentist or physician.

**(2) Topical Benefits of Fluoride:** Topical benefits, on the other hand, are temporary benefits that are gained when fluoride from external sources comes into direct contact with the surfaces of the teeth<sup>4,8</sup>. Topical benefits can be obtained through use of such things as fluoride toothpaste, fluoride mouthrinses, and fluoride treatments that are provided in dentists' offices.

Fluoride toothpaste does a great job in helping to prevent dental decay, but only provides a temporary topical benefit to the tooth surfaces. Fluoride toothpaste, by itself, also does not prevent decay as well as fluoride from the previously mentioned systemic sources<sup>3-4,6-8</sup>. Readily available from grocery stores, drug stores, and other commercial establishments, fluoride toothpaste is safe and should be used according to directions on the label. Fluoride toothpaste can be used by children and adults in areas served by fluoridated community water systems and does provide additional protection to teeth.

Fluoride mouthrinses are effective in preventing dental decay, but also only provide a temporary benefit and are not as effective as fluoride from systemic sources<sup>3-4,6-8</sup>. They are available over the counter (grocery stores, drug stores, etc.) or by prescription from dentists and physicians. Fluoride mouthrinses may be used at the same time that people are getting fluoride from systemic sources (community water fluoridation or fluoride tablets/vitamins with fluoride), however fluoride mouthrinses should only be used in these situations after consulting with the family's dentist or physician.

Fluoride treatments from a family's dentist also provide a temporary topical benefit to the tooth surface<sup>4, 6-8</sup>. These topical fluoride treatments may be used at the same time that an individual is receiving fluoride from systemic sources, but only if the dentist has determined that there is a need for a fluoride treatment because of the level of decay present in that individual.

It is important to remember that fluoride from topical sources, while effective in preventing dental decay, is not nearly as effective as fluoride from systemic sources<sup>4,8</sup>. Moreover, fluoride from topical sources should never be considered to serve as an adequate substitute for fluoride from systemic sources. The gold standard for dental disease prevention is community water fluoridation<sup>4,8</sup>. Community water fluoridation should be implemented whenever it is technically feasible. Fluoride tablets are meant to be used as a temporary substitute for community water fluoridation only until a community water system can be fluoridated. Topical sources of fluoride (fluoride toothpaste, fluoride mouthrinses, and fluoride treatments provided in dental offices) are only meant to be used as adjuncts to systemic sources of fluoride.

## **How Much Fluoride Is Added To The Drinking Water?**

Only a very small amount of fluoride is added to the drinking water to achieve the desired maximum benefits. The existing natural fluoride levels in drinking water supplies are adjusted slightly in order to raise them to between 0.7 and 1.2 parts per million<sup>10</sup>. This very small amount of fluoride being added is considered to be a trace amount. The precise level of fluoride calculated to be appropriate for each individual community is determined based on that community's annual average daily temperature<sup>11</sup>. Depending on the precise calculation, each community's water fluoride levels will be adjusted to either 0.7, 0.8, 0.9, 1.0, 1.1, or 1.2 parts per million depending on where the community is located and what type of climate it has<sup>11</sup>.

Whichever level of fluoride is determined to be the correct level for an individual community, it bears repeating that only a very small amount of fluoride is ultimately added to the drinking water. It also is important to remember that the optimal amount of fluoride in fluoridated drinking water has been calculated to take into account the fluoride the people get from other sources, like food and drink. Fluoridated drinking water provides only about one-third to one-half the amount of fluoride that an individual should be getting on a daily basis<sup>12</sup>.

## **Is The Amount Of Fluoride In Fluoridated Water Systems Safe?**

The amount of fluoride present in fluoridated community water systems is miniscule and has been determined to be safe for all individuals, regardless of age, race, gender, or health status<sup>13</sup>. In other words, community water fluoridation is safe for infants, children, teenagers, young adults, mature adults, and senior citizens<sup>13</sup>. It is safe for everyone, even those with chronic diseases<sup>13</sup>. Community water fluoridation harms no one and it is also effective in preventing dental decay in people of all ages, races, ethnic groups, or socioeconomic backgrounds<sup>13</sup>.

Fluoride is like many substances that are required to sustain life and promote health; it is beneficial in small amounts and harmful in large amounts. Such common substances as vitamins, minerals, table salt, food, even water, are helpful in the correct amounts and harmful in excessive amounts. For example, fluoride levels in fluoridated water are so low that an adult would have to consume 660 gallons of fluoridated water in a 2 to 4 hour period in order to get a toxic level of fluoride that would cause death<sup>14</sup>. It is physically impossible for an adult to ever consume that amount of water - the adult would die of other causes long before they were able to accumulate enough fluoride to cause a problem<sup>14</sup>. Likewise, a 12-18 month old child would have to drink 85 gallons of fluoridated water in a 2 to 4 hour period in order to get a toxic level of fluoride that would cause death, again a physical impossibility<sup>14</sup>.



In order to suffer chronic skeletal effects of too much fluoride, an adult would have to consume roughly 6 to 14 gallons of fluoridated water every day for 10 to 20 years - again physically impossible for virtually all adults<sup>14</sup>. Most adults drink far less than 1 gallon of water or other liquids a day. Children consume even much lower amounts of liquids than do adults on a daily basis.

A lifetime of drinking water fluoridated at the optimum level (0.7 to 1.2 parts per million) results in **NO** adverse effects to any individual or group of individuals<sup>13</sup>. Thousands of scientific studies have been completed which looked at individuals and groups who used water with optimum levels of fluoride their entire lives<sup>13</sup>. Lifetime exposure to fluoridated water caused no diseases, no disabilities, nor any other adverse conditions for any group or individuals<sup>13</sup>. Lifetime exposure to fluoridated water only resulted in benefits - lower rates of dental decay and lower health care bills<sup>13</sup>.

### **How Widespread Is The Practice Of Community Water Fluoridation In the United States?**

Currently over 152 million Americans are benefiting from community water fluoridation<sup>15</sup>. Another 10 million Americans are fortunate enough to live in communities with adequate levels of naturally occurring fluoride<sup>15</sup>. That means that nearly 66 percent of Americans with access to community water systems currently benefit from fluoridation's continuous protection against dental decay<sup>15</sup>. In Vermont, 55.7% of the population served by public water systems enjoys the decay-preventive benefits of fluoridation, ranking Vermont 38th among the 51 recognized jurisdictions (50 states + the District of Columbia).

The 162 million Americans benefiting from fluoridation live in more than 10,500 communities that are served by over 14,300 water systems<sup>15</sup>. In addition, 46 of the 50 largest cities in the United States are currently fluoridating their water systems<sup>15</sup>.

It is also important to remember that some communities in the United States have been fluoridating their public water systems since 1945, many since the 1950's and 1960's. We have over 60 years experience adjusting fluoride levels in community water systems.

## **Are There States That Require Fluoridation of Some Community Water Systems?**

Many states have passed legislation requiring community water systems to provide the benefits of water fluoridation for their customers. California, Connecticut, Delaware, Georgia, Illinois, Minnesota, Nebraska, Nevada, Ohio, and South Dakota require certain communities to fluoridate their public water systems<sup>16,17</sup>. Both the Commonwealth of Puerto Rico and the District of Columbia have also legislatively mandated fluoridation<sup>16</sup>. Additionally, Kentucky requires statewide fluoridation by administrative regulation<sup>18</sup>. Moreover, many local governments have required fluoridation through laws, regulations, and ordinances.

## **Who Benefits From The Cost Savings That Result From Fluoridation?**

The total cost to the nation for dental treatment services reported in 1997 was \$50.6 billion, while \$53.8 billion was spent in 1998 - a substantial amount usually paid for by individuals, employers, government agencies, and insurance companies<sup>19</sup>. Nationally, the tax-funded Medicaid program paid \$1.99 billion for dental services in 1998. Total dental expenditures in Vermont, paid for from all private and public sources, were estimated to be \$127 million in 1998. Moreover, Vermont's Medicaid Dental Program covered dental services for nearly 50,000 medically indigent children & adults and expended more than \$12.5 million in the 2004 state fiscal year, up from \$8 million in FY1998.

There are a number of ways in which individuals and groups benefit from the costs savings brought on by community water fluoridation, costs which are avoided because of the need for less dental treatment. For example, taxpayers benefit because public programs paying for dental care for disadvantaged populations require fewer local, state, and federal tax dollars for each person covered by the program<sup>20</sup>. It is expected that in the Vermont communities that implement water fluoridation, Medicaid dental costs would be reduced by at least one half. Other states have demonstrated significant cost savings in their Medicaid programs as a result of community water fluoridation<sup>107-108</sup>. The Federation of American Societies for Experimental Biology, in testimony before the Congressional Biomedical Research Caucus (U.S. Congress) in February 1995, documented that the national cost savings resulting from fluoridation totaled \$3.84 billion each year<sup>110</sup>. In addition, employers benefit because their costs for prepaid dental care fringe benefits for their employees are lower<sup>20</sup>. Employers also avoid the extra costs required when their employees are absent from work due to personal or family visits for dental care<sup>20</sup>.

Consumers benefit because they pay lower costs for consumer goods since employers' costs for insurance and employee absences is lower<sup>20</sup>. In other words, the cost of doing business in a fluoridated community is lower for employers.

Additionally, all patients benefit in several ways. First, their overall health care bills and insurance premiums are lower in fluoridated communities because there are fewer expensive hospital emergency room visits for dental emergencies, costs of which are usually passed on to everyone able to pay through their health care bills and insurance premiums<sup>20</sup>. Secondly, patients in fluoridated communities avoid having to pay higher health care bills, dental bills, and insurance premiums that often result from the need for physicians, dentists, and hospitals to pass on their extra costs for uncompensated care to those who can pay<sup>20</sup>.

It is most apparent that everyone wins with fluoridation. Not only do individuals benefit because of their improved oral health, but they benefit greatly because cost savings resulting directly and indirectly from a community's decision to fluoridate. Fluoridation ultimately promotes lower health care costs, lower insurance costs, lower tax-supported costs for public programs, lower business costs for employers, and lower costs for consumer goods and services<sup>20</sup>.

### **What Other Impact Is Water Fluoridation Having On Consumer Or Taxpayer Costs?**

The extensive use of community water fluoridation in the United States has contributed substantially to decreasing consumer and taxpayer costs for supporting dental education. Because of lower levels of dental decay in the U. S. population, fewer dentists are needed to care for those currently in the health care system. As a result, seven dental schools have ceased operations since 1985<sup>21</sup>. In addition since 1980, enrollment reductions in the remaining dental schools have been equivalent to the closure of another 20 average size dental schools<sup>21</sup>.

Community water fluoridation has also had an impact on the costs of dentists' malpractice insurance. Dentists practicing in fluoridated communities pay significantly lower malpractice insurance premiums than dentists practicing in non-fluoridated communities<sup>22</sup>. These lower malpractice insurance rates occur for several reasons. First, since the population suffers from much less decay in fluoridated communities, dentists do not spend as much time providing extensive reparative procedures and therefore are less likely to run into treatment complications. Secondly, dentists also do less general anesthesia and other forms of premedication in fluoridated communities because there are fewer cases of rampant decay in young children.

## **Who Supports Community Water Fluoridation?**

Most legitimate organizations of health professionals and scientists strongly support community water fluoridation. Table 1 provides a list of just a few of the hundreds of organizations that support fluoridation, their year of establishment, and the number of members they represent<sup>23</sup>.

**Table 1: Examples of Scientific, Technical, and Professional Organizations that Support Community Water Fluoridation<sup>23</sup>**

| <b>Professional Organization</b>               | <b>Established</b> | <b>Membership</b> |
|--|--------------------|-------------------|
| <b>American Medical Association</b>            | <b>1847</b>        | <b>296,000</b>    |
| <b>American Dental Association</b>             | <b>1859</b>        | <b>141,000</b>    |
| <b>American Dental Hygienists' Association</b> | <b>1923</b>        | <b>100,000</b>    |
| <b>American Osteopathic Association</b>        | <b>1897</b>        | <b>43,000</b>     |
| <b>American Dietetic Association</b>           | <b>1917</b>        | <b>70,000</b>     |
| <b>American Academy of Pediatrics</b>          | <b>1930</b>        | <b>49,000</b>     |
| <b>American Academy of Family Physicians</b>   | <b>1947</b>        | <b>84,000</b>     |
| <b>American Public Health Association</b>      | <b>1872</b>        | <b>50,000</b>     |
| <b>American Nurses Association</b>             | <b>1893</b>        | <b>180,000</b>    |
| <b>National Academy of Sciences</b>            | <b>1863</b>        | <b>2,200**</b>    |
| <b>American Water Works Association</b>        | <b>1881</b>        | <b>52,000</b>     |

**\*\* The 2,200 Members of the National Academy of Sciences include more than 160 Nobel Prize Winners.**

Some other well-known organizations and agencies supporting community water fluoridation include the National Academy of Sciences (established 1863), the U. S. Public Health Service (established 1798), the National Institutes of Health (established 1891), the U. S. Centers for Disease Control (established 1946), and the World Health Organization (established 1946)<sup>23</sup>. These and many additional scientific and professional organizations that recognize the public health benefits of community water fluoridation are listed in the Appendix.

It is important to note that these broadly based organizations represent millions of health practitioners, scientists and other professionals. These credible and respected organizations have also been working to improve the lives of Americans for many years. They are organizations and agencies with established administrative offices, some with state and local chapters, and many publishing peer-reviewed scientific journals.

Community water fluoridation has also been repeatedly shown to have wide support of the American public<sup>24-25</sup>. Most recently, a national scientific poll taken by the prestigious Gallup Organization documented that 70% of Americans thought community water systems should be fluoridated, 12% did not know, and only 18% thought that community water systems should not be fluoridated<sup>24</sup>.

## **Who Opposes Community Water Fluoridation?**

While there is a small, very vocal, minority of the population that opposes the implementation of community water fluoridation, no credible national scientific or professional organization opposes the practice<sup>16,26</sup>. Individuals who oppose fluoridation are often called 'antifluoridationists.' Most groups that claim to oppose fluoridation have few members, have no history because they have been organized for relatively short periods of time, have no established offices because they often operate out of individuals' homes, and have unfamiliar names and spokespersons<sup>16,26</sup>. These groups have been granted no professional credibility or scientific standing by the scientific or health care communities, publish no accepted scientific journals, and frequently use multiple names in order to appear to have more support for their position than actually exists<sup>16,26-31</sup>. Most of the groups lack any stability, disbanding and reforming periodically as interest in their movement periodically increases or subsides<sup>16,26-31</sup>. The antifluoride groups often publish pseudoscientific propaganda pieces which, when vigorously reviewed and investigated, lack any basis in science<sup>16, 26-31</sup>. Many of these organizations operate exclusively through the Internet where there is little in place to protect consumers from their scientifically invalid claims and their extensive propaganda<sup>29-31</sup>.

## **What Are Some of the Claims Against Fluoridation that are Being Made by Antifluoridationists?**

**Bone Health:** Antifluoridationists often claim that the fluoride from community water systems is bad for bones, that it causes osteoporosis, that it is responsible for increased hip fractures in senior citizens, and that it causes bone cancer. Not only have such claims never been demonstrated in legitimate scientific studies, just the opposite has been shown to be true.

Most studies show no differences in the prevalence of osteoporosis or hip fractures for those people living in fluoridated communities when compared to those living in non-fluoridated communities<sup>32-37</sup>. A recent study actually demonstrated that populations living in fluoridated communities had fewer hip fractures than those living in non-fluoridated communities<sup>37</sup>. An additional study even demonstrated the significant benefits of using fluoride to treat osteoporosis of the spinal column in post-menopausal women<sup>38</sup>. Regarding the allegation that fluoridation causes bone cancer, studies indicate otherwise - that fluoridation is not related to bone cancer<sup>13, 39-40</sup>.

**Adult Dental Health:** Antifluoridationists repeatedly claim that community water fluoridation is only effective in preventing decay in young children. Thankfully, this antifluoridationists' claim is incorrect. Fluoridation benefits people of all ages, whether they are infants, children, adolescents, young adults, middle-aged adults, or the elderly. It is quite clear that adults exposed to fluoridated water experience much less tooth decay than their counterparts who do not have access to fluoridated water<sup>41</sup>. Moreover, substantial benefits to older persons have been documented repeatedly in studies that show a significant decrease in root decay in older Americans<sup>41-45</sup>. Root decay occurs in adults for two reasons. First, as people age, the gum tissue recedes so that soft root surfaces become exposed to decay-causing foods in the mouth<sup>41-45</sup>. Second, as people age or as they become dependent on certain types of medications used to manage chronic health conditions, the flow of saliva tends to become diminished, resulting in what has been termed "dry mouth"<sup>46</sup>. Dry mouth can result in a substantial increase in the likelihood that teeth will decay<sup>46</sup>. Root decay is a serious problem in older Americans and has been shown to be a significant reason for loss of teeth after age 55<sup>47</sup>.

**Total Fluoride Intake in Children and Adults:** Antifluoridationists make a number of bogus claims about total fluoride intake in children and adults. Those few individuals opposed to fluoridation often try to claim that children and adults in the United States routinely get too much fluoride or that fluoride intake for children and adults is somehow increasing. Nothing could be further from the truth. Fluoridation levels for communities have been calculated so as to factor in the amount of fluoride that children and adults get from other sources<sup>4,12,48-52</sup>. Moreover, fluoride consumption for both children and adults in the United States has repeatedly been demonstrated to fall well within a wide margin of safety<sup>12,48-53</sup>.

**Dental Fluorosis:** Antifluoridationists frequently claim that children and adults living in fluoridated communities suffer from an increased amount of dental fluorosis. Again, there are a number of significant problems with these allegations by the antifluoride minority. Firstly, dental fluorosis is a relatively rare occurrence and describes a range of conditions which mostly do not occur in the United States<sup>13</sup>. Fluorosis occurs when children consume more than optimal amounts of fluoride during tooth development<sup>13,54</sup>. Antifluoridationists often exhibit photographs of children living in other countries where serious industrial pollution causes teeth to have permanent brown stains. These brown stains are examples of moderate and severe fluorosis, a condition directly related to industrial pollution and almost never seen in the United States<sup>13,54-55</sup>.

The types of fluorosis seen occasionally in the United States are the questionable, very mild, and mild forms<sup>13,55</sup>. Questionable and very mild fluorosis result in changes in teeth so subtle that only trained dental examiners are likely to discover them<sup>13,55</sup>. Mild fluorosis is characterized by a subtle white lacy appearance of the teeth, barely discernable by someone looking closely at the teeth<sup>13,55</sup>. None of these minor forms of fluorosis (questionable, very mild, or mild fluorosis) are considered abnormal or of any health consequence<sup>12-13,55</sup>. Questionable, very mild, and mild fluorosis usually result from very young children swallowing too much fluoride toothpaste or from the inappropriate supplementation with prescription fluoride products such as (1) when physicians and dentists independently prescribe fluoride supplements or (2) when physicians and dentists prescribe fluoride supplements without checking the fluoride content of the child's water supply so that, in either case, a child gets a "double" dose of fluoride on a daily basis<sup>12,56-62</sup>.

Dental fluorosis also can occur when children consume water with high levels of naturally-occurring fluoride from private wells or community water systems with higher than optimum natural fluoride levels. Community water fluoridation plays almost no role in the development of any of the forms of fluorosis and certainly plays no role in the development of moderate or severe fluorosis.

Secondly, adults cannot get fluorosis<sup>13,56,63</sup>. Fluorosis is caused when high levels of fluoride are consumed during the time that children's teeth are developing under the gums<sup>13,56</sup>. Once all of the permanent teeth have fully formed in children and erupted into the mouth (usually between ages 14-18), fluorosis cannot occur<sup>13,56,63</sup>.

Thirdly, the various forms of fluorosis that occasionally occur in the United States are not considered to be any sort of adverse health effect<sup>13</sup>. They are not precursors to any diseases, despite the claims by antifuoridationists, nor are they of any concern other than as a minor issue of esthetics<sup>13</sup>. Moreover, because of the additional fluoride incorporated into the enamel of teeth with questionable, very mild, or mild fluorosis, they are likely to be much more resistant to decay.

**Skeletal Fluorosis:** Allegations by antifuoridationists that long-term consumption of fluoridated water causes skeletal fluorosis are untrue. Skeletal fluorosis occurs after long term consumption (10 years or more) of very high levels of fluoride, amounts which far exceed what one would consume with lifetime exposure to community water fluoridation<sup>12-13</sup>. Extensive studies looking at thousands of lifetime residents who routinely drank water with natural fluoride levels of 4-8 parts per million yielded only 23 cases of an extremely mild condition known as osteosclerosis and no cases of skeletal fluorosis<sup>53,64</sup>. Advanced skeletal fluorosis has not been demonstrated to occur even when people spend their entire lives drinking water with naturally occurring fluoride levels of as much as 20 parts per million<sup>12-13,53,64-65</sup>.

Advanced skeletal fluorosis is so rare in the United States that only 5 cases have been confirmed in the last 35 years<sup>12-13</sup>. These 5 cases of advanced skeletal fluorosis were related to industrial exposures of extremely high amounts of fluoride chemicals that occurred over a long period of time and in no way was related to community water fluoridation<sup>12-13</sup>.

**Reproduction, Infertility, Birth Rates, Genetics, and Sudden Infant Death Syndrome (SIDS):** Using the laundry list approach, antifluoridationists allege that fluoride from fluoridated water systems interferes with reproduction, lowers birth rates, causes genetic damage, and is responsible for sudden infant death syndrome (SIDS). Researchers have looked at each of these allegations in depth and have concluded that the allegations are not true<sup>13,53,57,64-85</sup>. Despite scientific evidence to the contrary, antifluoride zealots persist in repeating these false allegations.

**Cancer, Heart Disease, Kidney Disease, AIDS, Mental Deficit, and Alzheimer's Disease:** Using the same laundry list approach, antifluoride activists also attempt to induce panic in the public by claiming that fluoride from fluoridated water causes such dreaded diseases as cancer, heart disease, kidney disease, AIDS, and Alzheimers' Disease. These claims have resulted in the conduction of a substantial amount of scientific research, all of which demonstrate that the antifluoridationists' claims are without substance<sup>12-13,53,84-97</sup>. Again, as with the previously mentioned laundry list of alleged diseases attributed to community water fluoridation, scientific evidence counters the false allegations of the antifluoride minority.

**Fluoride Status in Europe:** Antifluoridationists often claim that "only the United States fluoridates its community water supplies," or that "98% of Europe is fluoride free," or even that "Europe has banned fluoride." All three of these claims are false. The World Health Organization strongly recommends the use of community water fluoridation where ever it is technologically feasible<sup>23,98</sup>. The phrase "technologically feasible" means (1) that the country has one or more public water systems that are capable of adding fluoride to the drinking water; (2) that drinking water systems are usable, safe, and dependable; and (3) that the country's water systems employ qualified water plant operators who can ensure that optimum levels of fluoride will continue to be maintained.

Currently, approximately 60 countries practice community water fluoridation, providing the benefits of optimally fluoridated drinking water to more than 360 million people<sup>98-99</sup>. While many of these countries which fluoridate their community water systems are in Europe, some European countries provide their populations with fluoride through alternative means. For example, France and Switzerland add fluoride to table salt to ensure that adequate amounts of fluoride are made available to all of their populations. Salt fluoridation was chosen because of inherent difficulties in using water fluoridation in communities with extremely complex water distribution systems. In addition, many South American countries utilize salt fluoridation because few of their citizens have access to drinking water from public water systems.



Other countries, especially Norway, Sweden, Finland, Denmark, and the Netherlands utilize their extensive national health care systems to deliver fluoride supplements to all children, as well as to provide routine topical fluoride applications in their public clinics. Many Eastern European community water systems have stopped fluoridation (some have even shut down their water treatment plants altogether) only because of their current financial difficulties and will likely be resuming fluoridation once their economies permit upgrading of worn out and outdated facilities. Not a single European country has "banned" fluoridation as alleged by America's antifuoride minority.

**U. S. Environmental Protection Agency:** Some antifuoridationists have claimed that the U. S. Environmental Protection Agency (USEPA) has banned fluoridation in the United States. This allegation serves as yet another example of the use of false and misleading statements by the antifuoride minority. First of all, the USEPA continues to support the use of community water fluoridation in public water systems in the United States, all of which fall under the Agency's regulations. As recently as 1997, a USEPA spokesperson reconfirmed that "recent reviews of the available toxicity data by the Department of Health and Human Services (1991) and the National Research Council (1993) support EPA's policy and the use of optimal fluoridation"<sup>100</sup>. An official letter from the USEPA that is included in the current Code of Federal Regulations further emphasizes that "fluoride in children's drinking water at levels of approximately 1 mg/l [1 part per million] reduces the number of dental cavities"<sup>101</sup>.

**Toothpaste Warning Label:** Recently, warning labels have been showing up on fluoride-containing toothpastes. Although unrelated in any way to community water fluoridation, there are several reasons why this has happened. First of all, most toothpastes sold in the United States contain fluoride at levels that are between 1,100 and 1,600 parts per million. Since toothpaste fluoride levels are more than 1,000 times higher than fluoride levels in community water systems, very young children swallowing substantial amounts of toothpaste could end up with mild to moderate fluorosis<sup>58</sup>. Mild to moderate fluorosis, while not being an adverse health effect, could result in some slightly stained permanent teeth<sup>58</sup>.

As discussed previously, older children and adults cannot get fluorosis, although they are less likely to swallow large amounts of toothpaste anyway<sup>13,56,63</sup>. While there is the hypothetical possibility that a very small child could intentionally swallow enough fluoride toothpaste to become acutely ill, there are other chemical constituents in toothpaste that would likely cause the child to vomit long before they swallowed enough fluoride to be harmful<sup>102</sup>.

In the U. S., any consumer products companies making health claims for their products, even if their products are sold over the counter, come under the regulatory authority of the U. S. Food and Drug Administration (FDA)<sup>102</sup>. The FDA requires that all over-the-counter products include warning labels for every such product to explain to the public what might happen if the product is consumed in larger quantities than recommended by the manufacturer<sup>102</sup>. While the FDA began enforcing this requirement a number of years ago by selectively imposing the regulation on various categories of consumer products, they only recently began enforcing the requirement on toothpastes<sup>102</sup>. It is important to note that there never has been a documented case of serious injury or death from children swallowing toothpaste<sup>102-103</sup>.

## **SUMMARY AND CONCLUSIONS**

Community water fluoridation has served the American public extremely well as the cornerstone of dental caries prevention activities for more than 59 years. The dental health and general health benefits associated with the consumption of water-borne fluorides have been documented for over 100 years. Ongoing research, often conducted in response to the repeated allegations by those opposed to fluoridation, continues to confirm the safety, effectiveness, efficiency, cost-effectiveness, and environmental compatibility of community water fluoridation.

Fluoridation also continues to be acclaimed as an important contributor to the health of the nation, most recently being named as one of the twentieth century's ten greatest public health achievements<sup>104</sup>. Dr. David Satcher, previously the Assistant Secretary for Health and the Surgeon General of the United States, reconfirmed the support of his office for community water fluoridation shortly before his term ended<sup>105-106</sup>. In addition, Vice Admiral Richard H. Carmona, the current Surgeon General of the United States, stated: "Policy makers, community leaders, private industry, health professionals, the media, and the public should affirm that oral health is essential to general health and well being and take action to make ourselves, our families, and our communities healthier. I join previous Surgeons General in acknowledging the continuing public health role for community water fluoridation in enhancing the oral health of all Americans."<sup>109</sup>

The adoption of community water fluoridation by local communities and state legislatures represents an excellent example of good public policy. Communities throughout the United States continue to exhibit sound decision-making and evidence their continued trust and faith in science and the health professions by adopting fluoridation. The acceptance of community water fluoridation by public officials ensures that all citizens of a community, regardless of age, race, ethnic background, religion, gender, educational status, or socioeconomic level, receive the same substantial dental disease prevention benefits currently available to the 162 million Americans on fluoridated water systems.

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## **APPENDIX I: National & International Organizations that Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay\***

**\*[From: *Fluoridation Facts*, © 1999, American Dental Association]**

Academy of Dentistry International  
Academy of General Dentistry  
Academy of Sports Dentistry  
Alzheimer's Association  
American Academy of Allergy, Asthma & Immunology  
American Academy of Family Physicians  
American Academy of Oral & Maxillofacial Pathology  
American Academy of Pediatrics  
American Academy of Pediatric Dentistry  
American Academy of Periodontology  
American Association for the Advancement of Science  
American Association for Dental Research  
American Association of Community Dental Programs  
American Association of Dental Schools  
American Association of Endodontists  
American Association of Oral & Maxillofacial Surgeons  
American Association of Orthodontists  
American Association of Public Health Dentistry  
American Cancer Society  
American College of Dentists  
American College of Physicians  
American Society of Internal Medicine  
American College of Prosthodontists  
American Council on Science & Health  
American Dental Assistants Association  
American Dental Association  
American Dental Hygienists' Association  
American Dietetic Association  
American Federation of Labor / Congress of Industrial Organizations  
American Hospital Association  
American Medical Association  
American Nurses Association  
American Osteopathic Association  
American Pharmaceutical Association  
American Public Health Association  
American School Health Association  
American Society of Clinical Nutrition  
American Society of Dentistry for Children  
American Society for Nutritional Sciences  
American Student Dental Association  
American Veterinary Medical Association  
American Water Works Association  
Association for Academic Health Centers  
Association of Maternal & Child Health Programs  
Association of State & Territorial Dental Directors  
Association of State & Territorial Health Officials  
British Dental Association  
British Fluoridation Society

British Medical Association  
Canadian Dental Association  
Canadian Dental Hygienists Association  
Canadian Medical Association  
Canadian Nurses Association  
Canadian Paediatric Society  
Canadian Public Health Association  
Chocolate Manufacturers Association  
Consumer Federation of American  
Delta Dental Plans Association  
European Organization for Caries Research  
FDI World Dental Federation  
Federation of Special Care Organizations in Dentistry  
Academy of Dentistry for Persons with Disabilities  
American Association of Hospital Dentists  
American Society for Geriatric Dentistry  
Health Insurance Association of America  
Hispanic Dental Association  
International Association for Dental Research  
International Association for Orthodontics  
International College of Dentists  
Institute of Medicine  
National Academy of Sciences  
National Alliance for Oral Health  
National Association of County & City Health Officials  
National Association of Dental Assistants  
National Confectioners Association  
National Council Against Health Fraud  
National Dental Assistants Association  
National Dental Association  
National Dental Hygienists' Association  
National Down Syndrome Congress  
National Down Syndrome Society  
National Foundation of Dentistry for the Handicapped  
National Kidney Foundation  
National PTA  
National Research Council  
National Rural Water Association  
Society of American Indian Dentists  
The Dental Health Foundation (of California)  
U.S. Department of Defense  
U.S. Department of Veterans Affairs  
U.S. Public Health Service  
U.S. Centers for Disease & Prevention (CDC)  
U.S. Health Resources & Services Administration (HRSA)  
U.S. Indian Health Service (IHS)  
National Institute of Dental & Craniofacial Research (NIDCR)  
World Federation of Orthodontists  
World Health Organization

## APPENDIX II: BIBLIOGRAPHY (Suggested Readings)

- American Council on Science & Health. **Fluoridation**. New York, NY; The Organization, 1990. iii+13p.
- American Dental Association (Council on Access, Prevention, & Interprofessional Relations). **Fluoridation Facts**. Chicago, IL; 1999. 57p.
- Barrett S & Rovin S (eds.). **The tooth robbers: a pro-fluoridation handbook**. Philadelphia, PA; George F. Stickley Company, 1980. xii+130p.
- Burt BA (ed.). **Proceedings for the workshop: cost effectiveness of caries prevention in dental public health, held at Ann Arbor, MI, May 17-19, 1989**. J Public Health Dent 1989; 56(5, Spec Issue):249-344.
- Consumers Union. **A two-part report on fluoridation**. Consumers Reports; 1978 (Reprint); (July-Aug).
- Easley MW, Wulf CA, Brayton KJ, & Striffler DF (eds.). **Fluoridation: litigation and changing public policy; proceedings of a workshop at the University of Michigan, August 9-10, 1983**. Ann Arbor, MI; The University of Michigan Press, 1983. vi+129p.
- Murray JJ, Rugg-Gunn AJ, & Jenkins GN. **Fluoride in caries prevention**, 3<sup>rd</sup> ed. Oxford, England, UK; Wright, publisher, 1991. x+396p.
- Newbrun E. **Cariology**, 2<sup>nd</sup> ed. Baltimore, MD; Williams & Wilkins, 1983. xvi+344p.
- U. S. Centers for Disease Control & Prevention. **Water fluoridation: a manual for water plant operators**. Atlanta, GA; The Agency, Apr 1994. xii+99p.
- U. S. Department of Health & Human Services, Public Health Service. **Review of fluoride benefits and risks: report of the Ad Hoc Subcommittee on Fluoride of the Committee to Coordinate Environmental Health and Related Programs**. Washington, DC; The Agency; Feb 1991. xii+134+81p.

### **APPENDIX III: SELECTED WORLD WIDE WEBSITES WITH SCIENTIFICALLY VALID FLUORIDATION INFORMATION**

#### **SELECTED STATE AGENCY & STATE ORGANIZATION WEB SITES:**

California Dental Association

<http://www.cda.org/public/index.html>

Delta Dental Plans of California

<http://www.deltadentalca.org/>

Dental Health Foundation (of California)

<http://www.dentalhealthfoundation.org/>

Kansas Dental Association

<http://www.ksdental.org/>

Kansas Department of Health & Environment, Oral Health Initiative

<http://www.kdhe.state.ks.us/ohi/>

Kansas Public Health Association

<http://www.kpha.bluestep.net/>

Sacramento District Dental Society

<http://www.sdds.org/>

**Vermont Department of Health**

<http://www.healthyvermonters.info/hi/dentalhealth/dentalservices.shtml>

Washington State Children's Alliance

<http://www.childrensalliance.org/>

Washington State Dental Association

<http://www.wsda.org/>

#### **SELECTED NATIONAL AGENCY & NATIONAL ORGANIZATION WEB SITES:**

American Academy of Family Physicians

<http://www.aafp.org/>

American Dental Association

<http://www.ada.org/>

National Center for Fluoridation Policy & Research

<http://fluoride.oralhealth.org/>

U. S. Centers for Disease Control, Division of Oral Health

<http://www.cdc.gov/nccdphp/oh/>

U. S. National Institutes of Health, National Center for  
Dental & Craniofacial Research

<http://www.nidr.nih.gov/>

U. S. Public Health Service (Report on Fluoride Benefits & Risks)

<http://www.cda.org/public/pubhsrvc.html>

U. S. Surgeon General (Report on Oral Health in America)

<http://www.nidcr.nih.gov/AboutNIDCR/SurgeonGeneral/default.htm>

### **SELECTED INTERNATIONAL WEB SITES:**

British Fluoridation Society

<http://www.bfsweb.org/>

Calgary (Alberta, Canada) Regional Health Authority

<http://www.crha-health.ab.ca/>

### **ACKNOWLEDGEMENT:**

The author wishes to thank Dr. Donald Swartz (Director, Division of Health Improvement & Director of Maternal & Child Health); Dr. James Lasaponara (Interim Chief, Dental Health Services); and Ms. Alida Lund (Fluoridation Program Consultant, Dental Health Services); all with the Vermont Department of Health; Burlington, Vermont for their assistance in updating Vermont health & demographic data and in preparation of the final document.